Aug. 18, 1931. H. E. HUDSON 1,819,841

STACKING MACHINE

Filed Feb. 2, 1926 2 Sheets-Sheet 1

FIG. 1

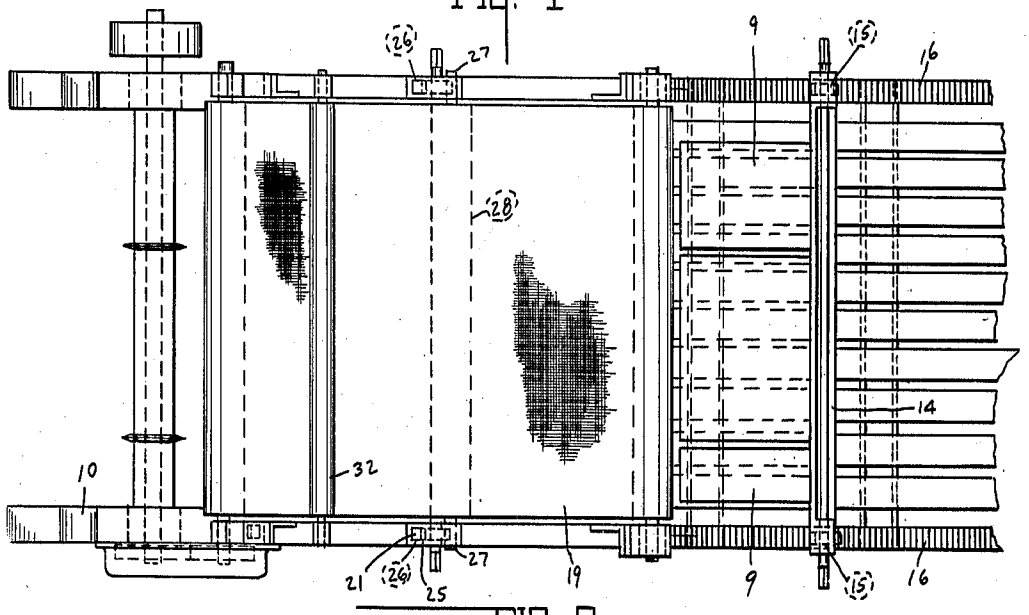


FIG. 2

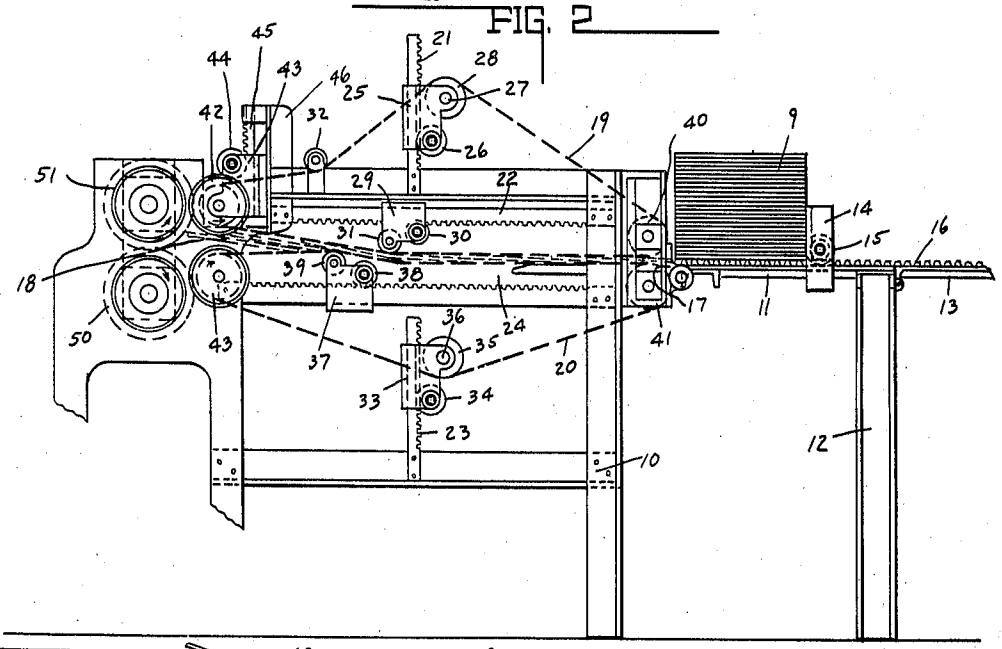
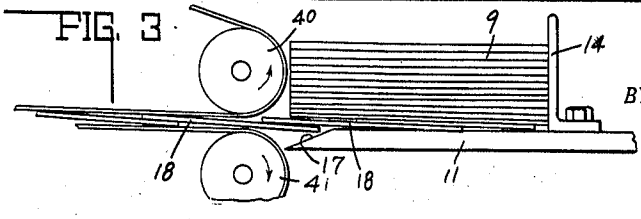


FIG. 3



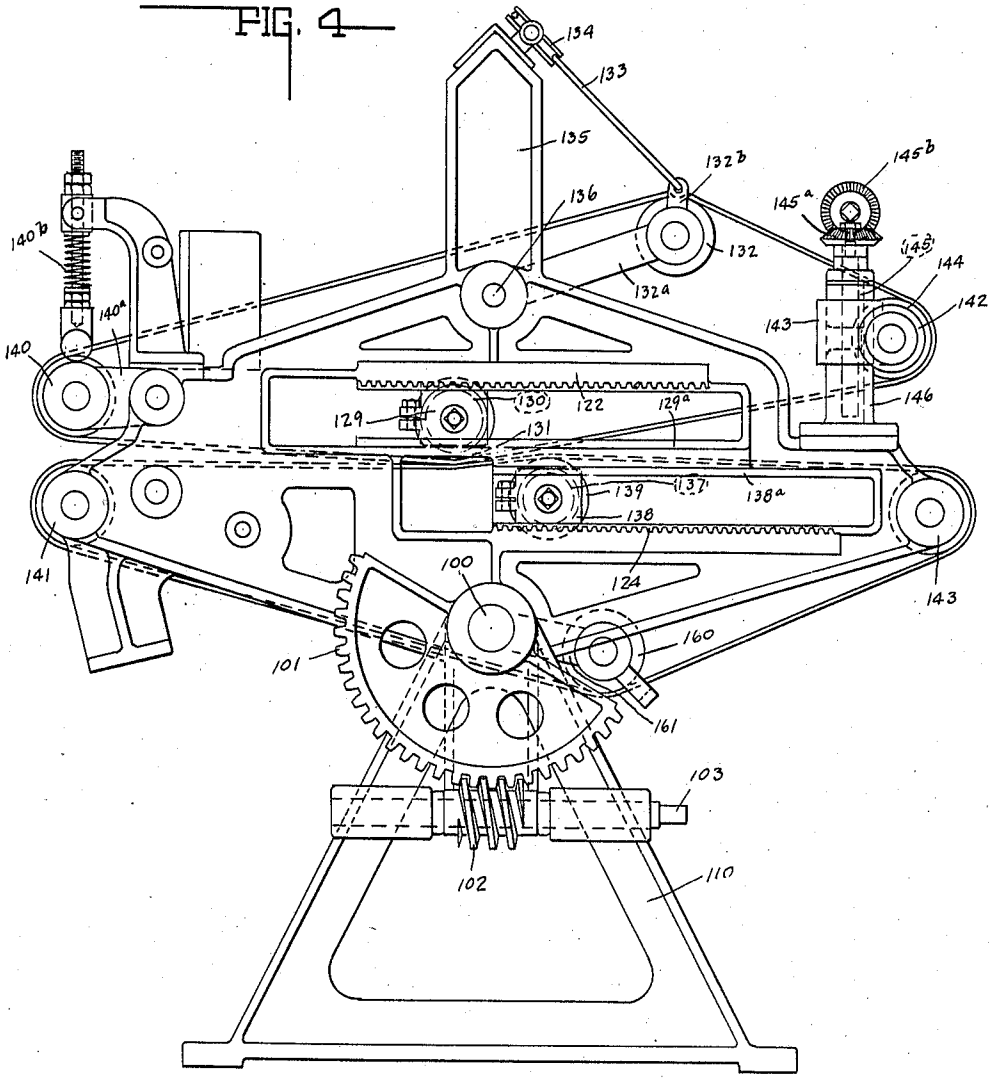
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FIG. 4



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UNITED STATES PATENT OFFICE

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STACKING MACHINE

Application filed February 2, 1926. Serial No. 85,467.

This invention relates to a stacking machine for sheets and the like.

The chief object of the invention is to stack a plurality of sheets successively presented in spaced or over-lapping relation.

Another object of the invention is to stack into a plurality of piles without interlocking, a plurality of pieces formed from a single sheet, the single sheets being presented in spaced relation.

One chief feature of the invention consists in the provision of means whereby the sheet, whether presented in spaced or over-lapping relation with regard to adjacent sheets, is tucked beneath the stack and between the lowermost sheet of the stack and the stack support, this being accomplished by the relative spacing between the stack support and a portion of the bottom of the stack and a feeding mechanism.

Another chief feature of the invention consists in the adjustability of the machine to accommodate sheets of various thicknesses, various lengths and various breadths.

A further feature of the invention consists in the positioning in predetermined relation of the successively received sheets.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings Fig. 1 is a top plan view of a machine for forming a sheet in plurality of smaller sheets and stacking said sheets in a plurality of piles. Fig. 2 is an end elevation of the same. Fig. 3 is an enlarged sectional view showing the method of inserting the sheet between the bottom of the stack and the stack support. Fig. 4 is an enlarged elevational view of a slightly modified form of conveyor.

In the drawings 10 indicates a framework of the machine, 11 a table extending therefrom supported by a standard 12, associated with which is an extension 13, the latter being maintained in horizontal position when the size of the sheets require and being maintained in the vertical position when not required. The platform or stack support 11, the terms being used interchangeably hereinafter and in the claims, adjustably supports a back stop 14, the position thereof being adjusted upon the table by means of the pinions 15 meshing with racks 16. The stack 9 as shown clearly in Fig. 3, projects beyond the level end of the platform and over-lies the same. However, the platform 11 is provided with a beveled projecting edge 17 which extends beyond the stack thereby forming between the projected plane including the bottom of the stack and the supporting surface of the platform, a space into which the sheets are fed successively. The sheets are indicated in the several figures by the numeral 18.

The means for feeding the sheets to the stack formation is herein illustrated as a pair of endless belts, the upper belt being indicated by the numeral 19 and the lower belt by the numeral 20. The framework 10 includes a pair of racks 21 and 22 at each side of the machine one extending longitudinally of the belt travel and the other extending transversely thereto. Below the same is a similarly positioned similar pair of racks 23 and 24 at each side of the machine. Adjustably supported by each rack 21 is a bearing block 25, the adjustable support being obtained through the pinion 26. The aligned blocks 25 support a shaft 27 which carries the roll 28 supporting the endless belt 19. The bearing block 29 is similarly provided with a pinion 30 meshing with rack 22. The pair of blocks 29 carry a roll 31, also associated with belt 19. An adjusting idler pulley or roll 32 is also provided.

The lower belt 20 is similarly supported by the bearing blocks 33 adjustably mounted through the medium of the pinions 34, the belt engaging roll 35 being carried by shaft 36 in blocks 33. Bearing blocks 37 on racks 24 carrying pinion 38 support the belt engaging roll 39. A pair of rolls 40 and 41 adjustably mounted with respect to each other constitute the discharge end of the conveying or feeding means and the belts 19 and 20 pass over said rolls. The mouth or supply end of the conveying and feeding means is herein shown including the adjustably supported roll 42, and an adjacent roll

43, the belts 19 and 20 passing over the same, respectively.

The frame 10 or extension thereof, or even a separate frame, is adapted to support suitable mechanism, and herein one type of mechanism will be briefly described, to wit, a pair of cutting, blanking or forming rolls 50 and 51 driven in timed relation with the endless conveying means 19 and 20. A sheet fed between the rolls 50 and 51 will be suitably operated upon, for example as herein illustrated, see Fig. 1, to sever said sheet into a plurality of smaller sheets of predetermined size. The several pieces of each sheet, therefore, lie on the conveyor in transverse alignment with respect to the direction of travel of the sheet and are presented simultaneously to the beveled jaw of the platform or stack support. The feeding means in continuing its movement forces the several portions of the sheet or the single sheet upon the platform, and successive sheets are similarly presented and are interposed between the lowermost sheet on the platform and the beveled edge of the platform. Each sheet or piece of sheet is caused to raise the pile or stack of sheets and thereafter be pushed into stack formation, this being secured through the medium of the abutment or stop 14.

The conveyor construction shown herein is not an ordinary multiple belt conveyor having parallel portions between which the article to be conveyed passes. This conveyor construction by reason of its adjustability, permits the accommodation of sheets of variable length, breadth and thickness. Furthermore, said conveyor by proper longitudinal adjustment is adapted to position the successive sheets so that the forward edge of the rearward sheet may be supplied to the conveyor system beneath the rearward edge of the forward sheet. This is secured by reason of the fact that as each sheet passes through the conveyor the rear end of it is deflected upwardly.

In Fig. 4 a modified form of conveyor construction is illustrated which is slightly different from that shown in Figs. 1 and 2, particularly in this respect that the entire construction can be tilted upon a horizontal axis 100 by means of a segmental worm gear 101 meshing with a worm 102 having an operable portion 103 preferably adapted to receive a hand crank. The entire frame construction is thus pivotally mounted upon a horizontal axis for adjustability.

In addition thereto, the conveyor construction disclosed herein includes the horizontal racks 122 and 124 with which mesh pinions 130 and 137, respectively, carrying shafting mounted in blocks 129 and 138, slidably mounted upon the ways 129^a and 138^a, respectively. Each of the aforesaid shafts rotatably supports the belt engaging roller 131 and 139, respectively. The former engaged belt is the upper belt and the latter is the lower belt. Associated with the upper belt is the discharge end roller 140 adjustably mounted by the pivotal arms 148 and adjustably and yieldingly supported by the mechanism 140^b. Also associated with the upper belt is the receiving end roller 144 supported by shaft 142, in turn mounted in bracket 143. Bracket 143 is associated with a standard 146 and mounted in said standard is a shaft carrying a worm meshing with a wheel carried by the shaft 142. Bevelled gears 145^a and 145^b are adapted to raise and lower the bracket 143 for adjusting the receiving position of the upper roller.

A roller 132 is pivotally supported in a pivotally supported arm 132^a pivotally supported at 136 upon the framework. The arm 132^a has an extension 132^b extending by an adjustable tie rod or a cable 133 associated with a pulley 134 mounted in the upright 135 carried by the framework of the machine. In this way the tension of the belt can be maintained through the idler pulley 132. The lower belt is maintained in position by the receiving end pulley 143 and the discharge end pulley 141. A suitable idler pulley 160 pivotally mounted in the bracket 161 also pivotally mounted upon a common axis 100, is provided for securing the desired adjustable tension in the lower belt. In this form of the invention it will also be noted that the belts are slightly offset from the horizontal relation intermediate the receiving and discharge ends by the rolls 131 and 139 so that the same is adapted to position the successively discharged sheets with the forward edge of the rearward sheet underlying the rearward edge of the forward sheet. This is secured by reason of the deflection of the belts with respect to the horizontal plane through the adjacent portions of the upper and lower belts.

The invention claimed is:

1. In a sheet feeding device, the combination of two superposed substantially triangular endless belt conveyors having their base portions cooperating as opposed runs with a common direction of movement, and means for offsetting said opposed runs intermediate the ends of the opposed portions of said conveyor for the reception of and overlapping conveyance of successively presented overlapping sheets.

2. In a sheet feeding device the combination of two superposed endless conveyors having their adjacent base portions cooperating as opposed runs with a common direction of movement, means associated with each of said opposed runs for forming an angle in each, the angularity being such that the rearward end of each sheet and the sheet is tilted upwardly to permit positioning of a following sheet beneath.

3. A device as defined by claim 2 characterized by said endless conveyors comprising belt conveyors, and means associated with each conveyor for maintaining the desired tension therein.

4. In combination a stack supporting platform including a stop, an upwardly inclined bevelled edge beneath the sheet supporting plane of the platform for receiving the forward edge of successively presented sheets and guiding the same beneath a stack thereof for stop engagement and pile formation, and a conveyor mechanism for presenting a plurality of sheets in overlapped relation with the rearward edge of the preceding sheet overlapping the forward edge of the following sheet, said conveyor mechanism including a plurality of endless conveyors having substantially parallel and opposed adjacent runs movable in the same direction and including an offset portion arranged to tilt each sheet from its previous line of travel to elevate the rear end thereof to permit positioning of the forward edge of the succeeding sheet therebeneath.

In witness whereof, I have hereunto affixed my signature.

HARRY E. HUDSON.